WHAT IS CLAIMED IS:

1. An apparatus (10) comprising a turning mechanism which is adapted to change the orientation of a number of packaging containers (12) in motion in a filling machine, from a first orientation (20) to a second orientation (22), comprising a conveyor (26) provided with at least one carrier (28) to which at least one carrier unit (58) is connected, **characterised in that** the carrier unit (58) is rotary in relation to the carrier (28) about a geometric axis of rotation (A) and adapted to carry the packaging container (12) in such a manner that the point of gravity of the packaging container during the change in orientation is substantially located on the geometric axis of rotation (A); and that the point of gravity of the packaging container thereby maintains substantially the same direction of movement and speed from the first to the second orientation (20, 22).

2. The apparatus (10) as claimed in Claim 1, **characterised in that** the carrier (28) comprises a first carrier member (30) and a second carrier member (32); that at least one of the carrier members is displaceable in relation to the other in a first direction; and that the carrier unit (58) is rotatably connected to each of the carrier members (30, 32) where each respective rotary connection is located a distance from each other in a second direction transversely of said first direction.

3. The apparatus (10) as claimed in Claim 2, **characterised in that** the carrier unit (58) is non-rotationally connected to a shaft (64) which is journalled in one of the carrier members (30); that the carrier unit (58) is further provided with a pin (66) which is moveable in a track (68) provided in the second carrier member (32); and that the mutual relationship of the shaft and the pin is such that a displacement of at least one of the carrier members (30, 32) in relation to the other entails a rotation of the carrier unit (58) which corresponds to a change of orientation of the packaging container (12) from the first to the second orientation (20, 22).

4. The apparatus (10) as claimed in Claim 3, **characterised in that** the shaft (64) coincides with the geometric axis of rotation (A).

5. The apparatus (10) as claimed in any of the preceding Claims, **characterised in that** the carrier unit (58) is provided with a pair of finger portions (72) adapted to carry the packaging container (12), and that said finger portions (72) being adapted in relation to the geometric axis of rotation (A) such that the point of gravity of the packaging container coincides with said axis of rotation (A).

6. The apparatus (10) as claimed in Claim 5, **characterised in that** the packaging containers (12) which are fed are packaging containers (12) whose corner flaps (14) point substantially straight out from the sides of the packaging containers; and that the finger portions (72) of the carrier unit are adapted to be capable of carrying the packaging container (12) under said corner flaps (14).

7. The apparatus (10) as claimed in Claim 6, **characterised in that** the finger portions (72) cooperate with at least one arrest heel (74) which is adapted to abut against the one fold edge of each respective corner flap (14).

8. The apparatus (10) as claimed in any of the preceding Claims, **characterised in that** the carrier unit (58) is rotated through substantially 90° so that the second orientation (22) of the packaging containers (12) is at right angles to the first orientation (20).

9. The apparatus (10) as claimed in any of Claims 2 to 8, **characterised in that** the carrier members (30, 32) are moveable in relation to one another in that the conveyor (26) comprises a number of tracks (1 to 3) which each form a loop; that the carrier members (30, 32) are guided in the tracks (1 to 3); and that the tracks (1 to 3) comprise switching sections (78, 80, 82) which each permit that at least one of the carrier members may change track.

10. The apparatus (10) as claimed in any of Claims 5 to 9, **characterised in that** the finger portions (72), while the container (12) is located in its first orientation (20), point in a direction substantially transversely of the direction of transport of the containers; and that the finger portions (72), while the container (12) is located in its second orientation (22), point in a direction substantially rearwards in relation to said direction of transport.

11. The apparatus (10) as claimed in any of Claims 2 to 10, **characterised in that** the carrier members (30, 32) are displaceably journalled on at least one shaft (38), said shaft (38) being interconnected with a belt (34, 35), provided for the conveyor, (26) by means of a clamping device (42).

12. The apparatus (10) as claimed in Claim 11, **characterised in that** the belt (34, 35) is comprised in a belt transmission which also comprises at least one pulley (60, 62) over which the belt (34, 35) is adapted to run; that the carrier members (30, 32) are displaceably journalled on two shafts (38), said shafts (38) being interconnected with said belt (34, 35); and that the centre points of the shafts are displaced a distance (Δ_r) from the pitch line (L) of the belt in a direction substantially at right angles thereto outwards from the pulley (60, 62) so that the mutual spacing between the two shafts (38) is of equal size when both the shafts (38) are located over said pulley (60, 62) and when they are located in a portion of the transmission where the belt (34, 35) is substantially straight.

13. The apparatus (10) as claimed in Claim 12, wherein the length of said distance (Δ_r) is the difference r_1-r_0, where r_0 is the radius from the centre of the pulley to the pitch line (L) and r_1 is calculated in accordance with the formula

$$r_1 = \frac{a}{2\sin\left(\frac{a}{2r_0}\right)}$$

where a is the mutual spacing between two shafts (38) when the belt is straight.

14. The apparatus (10) as claimed in any of Claims 11 to 13, wherein the belt (34, 35) is a toothed belt.

15. The apparatus (10) as claimed in Claim 14, wherein the clamping device (42) for securing the shaft (38) to the belt (34, 35) comprises a first part adapted for whole or partial abutment in a tooth gap in the belt (34, 35) and in support means (46) in the shaft (38), said support means (46) forming continuations of the tooth gap at each end thereof and in which support

means (46) the first part (44) may be snapped down; and wherein the first part (44) at each end is connected to a second part (48, 50) in the form of a yoke element, said yoke elements (48, 50) being adapted to surround the shaft (38) so that there is formed a wrapping angle (γ) between the abutment points of the first part in the support means (46) in the shaft (38) and the abutment points of the yoke elements against the shaft (38) which is sufficiently large for the geometry of the shaft to be capable of retaining the clamping device (42) in a secured position.

16. The apparatus (10) as claimed in Claim 15, wherein the shaft (38) is provided with at least one depression (56) adapted to at least partly accommodate the belt (34, 35) and in which depression (56) the support means (46) are placed.

17. A method of changing the orientation of a number of packaging containers (12) in motion in a filling machine, from a first orientation (20) to a second orientation (22), the method comprising the steps of:
carrying a packaging container (12) by a carrier unit (36) which is connected to a carrier (28) in a conveyor (26) and turning the carrier unit (58) in relation to the carrier (28) about a geometric axis of rotation (A) in such a manner that the point of gravity of the packaging container during the change in orientation is substantially located on the geometric axis of rotation (A), the point of gravity of the packaging container thereby retaining substantially the same direction of movement and speed from the first to the second orientation (20, 22).